

Abstract

5 A power system (8) is provided for economically supplying uninterrupted electrical power to one or more critical loads (14). One or more fuel cell power plants (18) provide one substantially continuous source of power, and a utility grid (10) provides another source of power. The fuel cell power plants (18) are adapted to be, and are, normally substantially continuously connected and providing power to, the critical load(s) (14). A rapidly-acting static switch (19) selectively connects and disconnects the grid power supply (10) to the critical load(s) (14) and with the fuel cell power plant(s) (18). A switch controller (49, 45) controls the state of the static switch (19) to connect the grid power source (10) with the critical load(s) (14) and the fuel cell power plant(s) (18) during normal operation of the grid (10), and to rapidly (less than 4 ms) disconnect the grid power source (10) from the load(s) (14) and fuel cell power plant(s) (18) when operation of the grid (10) deviates from normal beyond a limit. The controller (49, 45) causes rapid (less than 4 ms) reconnection of the grid (10) with the load(s) and power plant(s) (18) when the grid (10) returns to normal operation. The fuel cell power plants (18) each include power conditioning systems (PCS), and a site management controller (SMC) (31) connected to the PCS(s) is controlled by the switch controller (49, 45) to in turn rapidly transition the PCSs of the fuel cell power plants (18) between grid connected and grid independent modes.